

Integrated Diode Laser System DioPower



PC with LETSoft program



DioPower

Integrated Components

- Laser Diode from 15 to 120W
- Laser Diode driver up to 6V / 100A
- TEC-Driver up to 48V / 13A unipolar
- TEC-Cooler (Peltier cooler)

Features

- Selectable fiber coupled Laser Diode
- CW and pulse operation
- Laser ramp function
- RS232 PC Interface, optional USB
- User friendly LabVIEW program
- Interlock function, optional pilot laser
- Detachable fiber

Applications

- Material processing
- Laser soldering
- Plastics welding
- Medical application
- Pumping solid state and fiber lasers
- Illumination
- General purpose laboratory instrument



Description

The DioPower conveniently offers an integrated diode laser system. All necessary components such as the laser diode, the laser diode driver, the TEC-driver and the laser diode cooler are included. The customer can choose a suitable laser diode regarding his requirement.

Intuitive User-Friendly Interface

An internal microprocessor provides the flexibility and convenience of software. Our LabVIEW based program LETSoft can be used to control the DioPower. All parameters can be set and controlled by a PC via RS232 interface, optional by USB.

Built-In Laser Diode Protection Features

The DioPower features advanced circuitry to protect both the laser diode and the controller. Safety features include transient suppression, a suitable mains filter, delayed output enable, hardware interlock and a relay closure shorts the laser output when power to the DioPower is turned off.

An additional feature is if the laser temperature departs from a user defined temperature window, the laser current is switched off automatically.

Laser Ramp Function

The instrument can create a ramp shaped laser power. The laser power will go to the new value within a set time linearly. It can ramp up and down. Several ramp parts and also constant power parts can be combined to a customised power function.

Laser Diode Current Modulation

External inputs allow analogue modulations. An internal pulse generator allows digital modulation. The maximum modulation frequency of the laser diode current is 100Hz.

As a safety feature, the laser current limit can not be exceeded during external modulation. The range for the signal is 0 V to +10 V. The transfer function is 10 A / V.

Pilot Laser Control

If a high power laser diode is provided with a pilot laser, it can be controlled by the DioPower. The pilot laser can be switched on and off and its optical power intensity can be set.

Power Monitor

The instrument provides a power monitor output. This signal indicates the actual laser diode current. The range for the signal is 0 V to +10 V. The transfer function is 10 A / V.

Quasi Power Setting / Monitoring

Because the laser driver is current controlled, the laser power cannot be controlled directly. But the user can set two calibration points at the P/I characteristic line and the DioPower calculates the set power into set current and measured current into actual power. So the user can choose to set the laser current or set the laser power and can read the actual current and the actual power.

Error Indication

In any case of error, such as exceeding the customer set limits, the diode current is turned off immediately and an error message is send to the PC.



DioPower Backside



Specifications

Optical parameters of selectable laser diodes														
Optical Output Power [W]	15/20	30	32	35	40	45	50	60	75	80	100	120		
Wavelength [nm]	1470	808	808	808	808	808	808	940	940	808	880	915	808	
		880	940	940	940	880	880	980	980	880		940	940	
		915	980	980	980	915				915		980	980	
		940				940				940				
		980				980				980				
Wavelength tolerance (±) [nm]	10													
Fiber core diameter [µm]	200	200	200	100	200	400	200	200	400	400	400	400	200	
	400	400	400	200	400			400					400	
Numerical Aperture [NA]	0,22													
Fiber Connector	F-SMA 905, free standing fiber towards the module													
Electrical Parameters														
Typical Operation Current [A]	55	50	50	55	60	58	70	80	60	90	85	60		
Max. Operation Current [A]	66	60	60	60	72	70	84	96	66	105	100	72		
Typical Threshold Current [A]	10	10	10	10	10	10	8	8	6	9	6	10		
Typical operation voltage [V]	2	2	2	2	2	2	2	2	4,5	4,5	4,5	6		
Typical slope W/A	0,3	0,8	0,8	0,8	0,8	0,9	0,8	0,8	1,4	1,3	1,3	2,4		
Additional Features optional evaluable														
Pilot Laser	*	*	*	*	*	*	*	*	*	*	*	*	*	
Fiber detection sensor	*	*	*	*	*	*	*	*	*				*	
Exchangeable protection window	*	*	*	*	*	*	*	*	*					



Laser Diode Controller	
Power Laser Diode Driver	600 W
Max. Laser Diode Current	100 A
Max. Laser Diode Voltage	6 V
Ripple / Noise (rms)	200 mA
Current Limit Range	0 ... Max. Laser Diode Current
Current Adjustment Accuracy	100 mA
Temperature Coefficient	< 100 ppm/°C
Short Term Stability (1hr)	< 30 ppm
Long Term Stability (24hr)	< 75 ppm
Repetition Rate	0 ... 100 Hz
Pulse Width (*)	> 5 ms
Rise- / Fall- Time (*)	< 2ms (10 % – 90 % of max. current)
Analogue Modulation	
Input Voltage	0 ... 10 V, 1 kΩ
Transfer Function	10 A / V
Bandwidth	0 ... 100 Hz
Power Monitor	
Output Voltage 0 ... 10 V	Output Voltage 0 ... 10 V
Transfer Function 10 A / V	Transfer Function 10 A / V
Pilot Laser	
Pilot Laser Voltage	5 V
Pilot Laser Current	max. 300mA
Pilot Laser Power Adjustment	1 ... 100 %

TEC Controller	
Temperature Range	0 ... 50 °C
Temperature Stability	< 0,1 K
Temperature Adj. Accuracy	0,1 K
Control Loop	PI
Output Cooler	
TEC Output Power	600 W
TEC Current	0 ... 13 A
TEC Voltage	0 ... 48 V
TEC Current Limit Range	0 ... 13 A
Ripple	100 mA
Fan Voltage Adjustment Range (manual)	0 ... 100% (12 V)
Fan current	max. 1 A
Temperature Sensors	
Sensor Types	Thermistor / PT100 / PT1000
Thermistor	NTC, 10 kΩ @ 25°C, current: 100 μA
Power Supply	
Line Voltage	85 - 264 V AC, autoranging
Frequency	50 - 60 Hz
Power Consumption	1.500 W
Fuses rating for 115V AC	16A slow acting (5x20mm)
Fuses rating for 230V AC	8A slow acting (5x20mm)
General Characteristics	
Ambient Temperature, operating	0 ... 30 °C
Relative Humidity, operating	30 ... 70 %
Weight	6,4 kg
Dimensions	310 x 140 x 220 (W x H x D, mm ³)

Notes:

(*) The rise time, the fall time and the pulse width may be prolonged by long cables between the power supply and the laser diode.